EXAMPLE 2

This example illustrates the process provided by the present invention for production of ethylene and propylene by using various catalysts selected from the present invention.

The tests were carried out in a bench scale fixed-fluidized bed reactor at a temperature of 680^{0}. C., with a weight ratio of catalyst to feedstock of 15:1, a weight ratio of steam to feedstock of 0.8:1 and a weight hourly space velocity of $10h^{-}$. The results of the tests are listed in Table 4.

From the data of Table 4, it can be seen that catalysts A, B, C, D, E and F all exhibit high ethylene and propylene yields.

TABLE 4

Catalyst	A	B	C	D	E	F
Product Yields, wt %						
Cracked gas	67.26	68.61	69.70	69.32	73.97	70.48
in which, ethylene	19.50	19.81	20.77	20.41	22.75	22.26
propylene	21.58	22.72	22.47	22.52	25.13	22.66
butylenes	11.37	10.53	10.69	10.61	10.86	10.37
C_5 + naphtha	15.02	17.84	15.22	15.05	11.25	14.36
LCO	5.74	3.73	5.33	5.16	3.12	3.48
HCO	4.58	2.64	3.65	4.10	3.03	3.40
Coke	7.40	7.18	6.10	6.37	8.63	8.28
Light Olefins Yield, wt %	52.45	53.06	53.93	53.54	58.74	55.29

EXAMPLE 3

This example illustrates that heavy hydrocarbons with different boiling ranges can be used as feedstocks in the process provided by the present invention.

The tests were carried out in a bench scale fixed bed reactor using different catalysts. The operating condition and the results of the tests are listed in Table 5.

EXAMPLE 4

This example illustrates that the full range crude oil can be used as feedstock in the process provided by the present invention.

The test was carried out in a bench scale fixed bed reactor using Catalyst A. The operating conditions and the results of the tests are listed in Table 6.

TABLE 5

Feedstock	AGO	VGO	ATB
Catalyst	B	C	A
Operating Conditions			
Reaction temperature, .degree. C.	750	700	650
Contact time, sec	2	3	5
Catalyst/oil ratio	15:1	15:1	25:1
Steam/oil ratio	0.3:1	0.8:1	1:1
Product Yields, wt %			
Cracked gas	70.85	75.03	62.38
in which, ethylene	18.98	21.09	18.07
propylene	18.69	23.56	19.25
butylenes	10.23	10.47	9.86
C_5 + liquid	21.08	17.83	28.10
Coke	8.07	7.14	9.52
Light Olefins Yield, wt %	47.90	55.12	47.48

TABLE 6

Feedstock	Crude oil
Catalyst	A
Operating Conditions	
Reaction temperature, °C.	700
Contact time, sec	0.2
Catalyst/oil ratio	40:1
Steam/oil ratio	0.5:1
Product Yields, wt %	
Cracked gas	61.92
in which, ethylene	19.35
Propylene	18.02
Butylenes	10.89
C_5 + liquid	31.02
Coke	7.06
Light Olefins Yield, wt %	48.26

What is claimed is:

1. A process for producing ethylene and propylene, which comprises:

contacting heavy hydrocarbon feedstock with a hot catalyst in a reactor in the presence of steam, wherein the catalyst comprises pillared interlayered clay molecular sieve and/or phosphorous and aluminum or magnesium or calcium modified high silica zeolite having pentasil structure, and the contacting is performed at a temperature of 650-750.degree. C, a pressure of 0.15-0.4 MPa, a contact time of [0.2-0.5] 0.2 to 5 seconds; a weight ratio of catalyst to feedstock of 15:1 to 40:1 and a ratio of steam to feedstock of 0.3:1 to 1:1.

2. The process according to claim 1, wherein said catalyst can also contain Y molecular sieve.

3. The process according to claim 1, wherein said pillared interlayered clay molecular sieve is pillared interlayered rectorite.

4. The process according to claim 1, wherein said phosphorus and aluminum or magnesium or calcium modified high silica zeolite having a structure of pentasil is a 2~8 wt % phosphorus and 0.3~3.0 wt % aluminum or magnesium or calcium (based on zeolite weight, calculated as oxides) containing high silica zeolite having a structure of pentasil with a Si/Al mole ratio of 15~60.

5. The process according to claim 4, wherein said modified high silica zeolite having a structure of pentasil can also contain 0.3~.3.0 wt % nickel (based on zeolite weight, calculated as oxides).

6. The process according to claim 4, wherein said modified high silica zeolite having a structure of pentasil is prepared by mixing high silica zeolite having a structure of pentasil homogeneously with aluminum phosphate sol or magnesium phosphate sol or calcium phosphate sol and followed by calcining at $400\sim600^{0}$. C. for 3~6 hours in the presence of 60~100% steam.

7. The process according to claim 4, wherein said modified high silica zeolite having a structure of pentasil is

prepared by mixing high silica zeolite having a structure of pentasil homogeneously with phosphorus and aluminum or magnesium or calcium containing aqueous solution, and followed by impregnating for 0.5~4 hours, drying, calcining at 450~650° C. for 1~4 hours.

8. The process according to claim **5**, wherein said nickel in the modified high silica zeolite having a structure of pentasil is introduced by mixing nickel compound homogeneously with high silica zeolite having a structure of pentasil and phosphorus and aluminum or magnesium or calcium containing aqueous solution, and followed by impregnating for 0.5~4 hours, drying, calcining at 450~650° C. for 1~4 hours.

9. The process according to claim **4**, wherein said high silica zeolite having a structure of pentasil is one selected from the group of high silica zeolites having a structure of ZSM-5, ZSM-8 or ZSM-11 type.

10. The process according to claim **4**, wherein said high silica zeolite having a structure of pentasil is prepared by using water glass, aluminum phosphate and inorganic acid as raw materials, and Y zeolite as crystalline seeds, and crystallizing at 130~200° C. for 12~60 hours.

11. The process according to claim **1**, wherein said reaction effluent is quenched by injecting light hydrocarbons into the riser outlet as fast coolant.

12. The process according to claim **1**, wherein said heavy hydrocarbon feedstocks are atmospheric gas oil or Sum gas oil or the mixture thereof as well as residual oil or crude oil.

13. The process according to claim **1**, which further comprises:

separating reaction effluent by a gas-solid separation system in the outlet of a riser or downflow transfer line reactor;

quenching and separating the reaction effluent to obtain ethylene and propylene containing gaseous products and liquid products;

stripping spent catalyst by steam;

regenerating the steam stripped spent catalyst by contacting the spent catalyst with oxygen and burning off coke; and

stripping the spent catalyst for reuse.

14. The process according to claim **1**, wherein the high-silica zeolite having a structure of pentasil is without rare earth.

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